

Elasto-plastic behaviour in titanium alloys

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Neutron and synchrotron diffraction studies under mechanical stress in titanium alloys Ti-64 (near α -alloy), Ti-6246 ($\alpha+\beta$ alloy), Ti-5553 (near β -alloy) and Ti-38644 (β -alloy) were performed to investigate the deformation mechanisms. In particular, the determination of single-crystalline elastic constants derived from the measured lattice strains in the polycrystalline specimens will be presented. These results have been used further to quantify the load partitioning in the elastic regime between the softer β phase and stiffer α phase. In addition, diffraction data were collected along the entire elastic and plastic regime to determine the evolution of lattice strains, texture and phase compositions.

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